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ABSTRACT

This set of information sheets is intended to improve practice in special education through use of technology, media, and materials. The first information profile offers guidelines for using NCIP (National Center to Improve Practice) resources to effect change. Examples are given of how technology coordinators and others have used NCIP resources in their role as change agents. The second profile offers ideas for using multimedia with students having learning disabilities. Examples include using Hypermedia software to create multimedia stories, producing videos, and using media to improve writing skills. The third profile discusses using technology to help students with visual impairments improve their writing skills. It considers the importance of sensory feedback to the writing process and ways schools and families can help. The fourth profile describes the use of laptop computers to improve the learning of students with disabilities, addressing considerations for implementing a plan for laptop use, examples of how schools are using laptops, and features of portable computers and writing tools. The last profile is on ways that technology can support inclusion in preschool settings. It describes how a child with cerebral palsy uses various technologies in her regular class and how a specially designed keyboard aids students with autism. (DB)

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NCIP Profiles, 1-5, 1994.

EC304494

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NCIP Profiles 1
Fall 1994

Working with NCIP

Change Agents Are the Key

Their titles are as distinct as they are – technology coordinator, director of special education, team leader, teacher, parent advocate, or pre-service faculty. Yet they share a common goal – to help others solve problems, locate information, improve practice, implement new approaches, or grow as professionals. In doing so, they function as change agents.

The activities these change agents engage in are as varied as their titles – disseminating information, developing and conducting professional development activities, providing technical assistance, mentoring others, and even serving as cheerleaders. However, in order to carry out their work, change agents need ready access to information to disseminate, materials to use in training, or strategies for technical assistance. They also need to link to others who are doing the same kind of work.

Inside you will meet Kristen Eichleay, Lou McIntosh, and Bonnie Prohaska, three change agents who have joined the NCIP Community. By offering three interconnected resources – NCIP's print and video profiles, and NCIPnet (NCIP's telecommunications network) – NCIP helps change agents better serve their constituents. This profile takes a look at how each of these three change agents use a different NCIP resource as an avenue into the broader NCIP Community.

Read Me First

Welcome to the NCIP Community. "Working with NCIP" will acquaint you with NCIP's resources and provide you with visions of how to use them. Once you've read this, continue on to the other print and video profiles to learn more about integrating technology, media, and materials into special education classrooms.

What's Inside

- **Change agents: Who they are and what they do**
- **Ways a director of a special education technology center circulates *NCIP Profiles***
- **How a computer network manager uses NCIPnet to exchange information**
- **Ideas from a computer specialist for using NCIP's video profiles in distance learning**
- **Tips for change agents**
- **More about NCIPnet**

Photo: Monika Andi

Kristen Eichleay, far right, works with teachers to evaluate educational software.

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Avenues to Information

Profiles Showcase Technologies and Uses

Ask Kristen Eichleay about technology and she'll tell you that it can serve as a catalyst for classroom change. She believes that trying new technologies often pushes teachers to think in new ways about teaching and learning. As their thinking evolves, more innovative uses for technology surface. Then, according to Kristen, as teachers become more comfortable with technology, they are able to see the rewards of integrating students with disabilities in authentic ways.

But first teachers must become both familiar and comfortable with available technologies and their uses. As director of Boston Public Schools' Special Education Technology Center at Emmanuel College, Kristen believes that good sources of information can help pave the way for that change. She relies on NCIP's print profiles to help teachers understand how their students with disabilities can best be served by technology.

Kristen Eichleay uses *NCIP Profiles* to show teachers how students with disabilities can best be served by technology.

Kristen understands that a strong professional development program can stimulate, support, and sustain teachers as they explore ways to more effectively use technology to include students with disabilities. As she runs meetings and conducts ongoing workshops in response to teachers' needs, she will introduce and use both NCIP's print and video profiles.

Through these trainings, Kristen identifies teachers who can lead at the school level. These strong technology advocates become change agents in their own schools as they, in turn, share information and provide colleagues with technical assistance. Kristen is developing a notebook for each of these school-level change agents that will feature issues of NCIP's print profiles, additional resources retrieved from NCIPnet, and information about NCIP's video profiles featuring technology in use.

Kristen finds her cadre of school-level change agents eager for information about new ideas. "I can't get information out fast enough. The challenge is to put information into a form that is readily accessible and get it out to teachers quickly," she says, adding that NCIP materials can expedite the process. When teachers ask, "What should I try?" Kristen believes that the vignettes in *NCIP Profiles* can stimulate thinking about how similar approaches might work in their own classrooms.

Network Members Seek and Share Information

Lou McIntosh understands the value of information and the importance of getting it to the people who need it. As founder and manager of The Maine Meeting Place, a 1,000-user electronic network, Lou seeks to meet the information needs of parents, educators, and consumers.

He turns to NCIPnet as one way to help meet those needs. NCIPnet is a telecommunications network that allows its members to seek and share information about technology and disabilities. For Lou, this means he can both seek information from NCIPnet and share information posted by users of The Maine Meeting Place.

Lou and about 400 other NCIPnet users can send and receive personal mail, join in topical conversations, discuss software, find technology resources, and read summaries of prior thematic conversations.

Lou actively follows various topical conversations on NCIPnet, which include contributions from administrators, teachers, researchers, pre-service faculty, and policy makers.

Lou McIntosh, seen here with his son Douglas

Discussions on NCIPnet focus mostly on the issues relating to technology use in education. Recent conversations have included exchanges on laptop computers, inclusion issues, and technology resources to help students with visual impairments.

"NCIPnet gives me a chance to put parents in touch with a vital, ongoing, and immediate discussion of the latest developments in applications of technology in special education," Lou says, adding that he finds NCIPnet meets several of his needs. For example, Lou was interested in learning more about word prediction software packages and found help on NCIPnet. Conversation on NCIPnet has lead Lou to NCIP's print profiles, which he intends to excerpt for his own newsletter.

Video Profiles Offer Inside Look at Technology

As a computer specialist, Bonnie Prohaska knows the importance of capturing the interest of busy teachers in her area. Video particularly interests her because it provides an intimate look at how technology positively affects children's lives (especially those with disabilities). In addition, video is accessible – most teachers can play individual tapes on VCRs or watch live, interactive broadcasts on television.

Bonnie is planning to integrate NCIP's video profiles into an innovative professional development model that

exchanges information across networks.

incorporates distance learning. Vignettes in the videos each run about 10 minutes, bringing to life stories from selected NCIP print profiles.

Bonnie's home base is the metropolitan school district in Madison, Wisconsin, where she is investigating the possibility of offering a series of in-service programs through her city's local cable TV station. She would like to enrich existing program strategies by integrating NCIP's video profiles in the broadcasts. Program formats could combine video with guest teachers, experts, and resource personnel; demonstrations; and other videos of classroom practice by teachers in the system.

She believes videos play a critical role in stimulating teacher reflection and planning. A shared image can anchor conversation and promote questions and comments that spark discussions about practical issues. After watching a video, Bonnie looks for teachers to ask questions that begin with, "What if..." and "What does it take to make this possible?" These questions indicate that teachers are generating ideas and thinking about implementation of new approaches.

An in-service video broadcast often is made more effective with support materials. Preparatory materials help establish a program's purpose and context. During the broadcast, designated facilitators at each school can answer questions and follow up with technical assistance in classrooms. Information from NCIP's print profiles can foster further discussion about the topics introduced in the videos. Further questions might be answered on NCIPnet.

Bonnie envisions broadcasts concluding with an assignment: A task that strongly encourages teachers to take action, try a strategy, visit someone's classroom, read an article, or engage in a conversation on NCIPnet with others within the district or across the nation.

Bonnie Prohaska, left, works with Charlie at the Glenn Stephens REACH Program. Bonnie plans to use NCIP's video profiles in professional development.

Tips for Change Agents

Below are some tips that can help change agents and their constituents be active participants in the NCIP Community.

1 Get the word out.
Build awareness among your constituents (e.g. teachers, administrators, parents) about NCIP, members of its community, and its resources. Let people know about NCIPnet and *NCIP Profiles*, their topics, and how they are interconnected.

2 Make materials available.
Use a variety of strategies to ensure ready access to NCIP resources. For example, copy and place *NCIP Profiles* in mailboxes; place them in a binder in a central location; post them on bulletin boards; and hand them out at administrator, teacher, or parent meetings. Make copies of the video profiles and set up a lending library.

3 Encourage a ripple effect.
Let people know that copying and passing along NCIP resources and ideas is recommended.

4 Stimulate interest.
Let the materials become a catalyst for taking a next step toward effectively using technology with students who have disabilities. For example, build a mini-library around a specific topic by getting resources from NCIPnet's on-line library and adding other resources to them. Invite people to join NCIPnet discussions related to topics in the print profiles. Ask for volunteers to try a new strategy illustrated in a video profile and provide them with technical assistance for implementing that idea.

If you have other suggestions, please post them on NCIPnet in the Change Agents forum, or call, write, or send a fax to Judith Zorfass using the information on page 4 of this newsletter.

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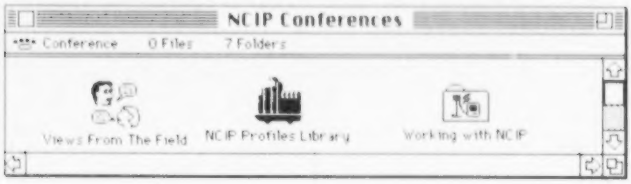
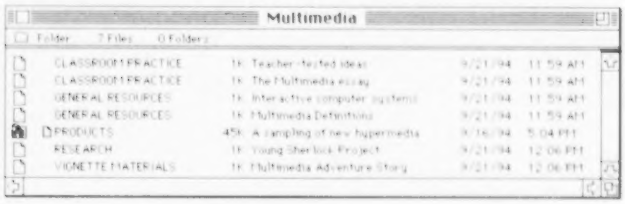
Join Us on NCIPnet

Main Menu

The illustration below shows the Main Menu screen that all users see when they first log on to NCIPnet. Each folder on the Main Menu contains items to help users learn more about using technology to enhance special education.

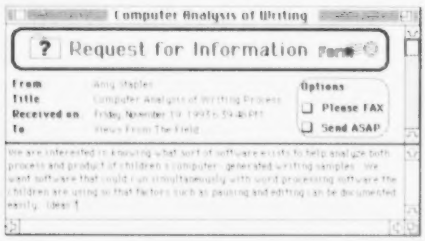




NCIP Profiles Library

You can access a variety of resources, including:

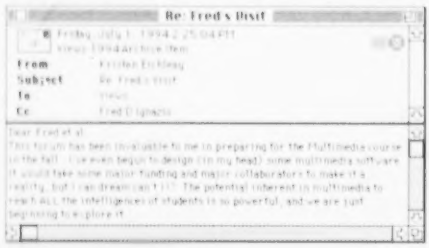
- additional examples of classroom or individual uses of technology related to those described in the profiles
- summaries of current research
- more detailed information about hardware and software
- helpful tips on managing technology use



"Views from the Field" Discussion Forums

This on-line meeting place allows you to

- request and share information and ideas
- discuss issues of common interest
- participate in discussions with on-line guests who are leaders in their fields



Working with NCIP

In this folder participants can:

- discuss strategies for using NCIP's print and video profiles and NCIPnet
- discuss other implementation strategies and issues

For more information, contact:

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NCIP Profiles 2
Fall 1994

What's Inside

- The challenges facing writers with learning disabilities
- How a variety of media can help students write
- High school students use Hypercard™ software to create multimedia stories
- "At-risk" students produce videos about inner-city life
- Strategies for creating successful multimedia projects
- A list of additional resources about multimedia on NCIPnet

Multimedia and More

Help for Students with Learning Disabilities

What to write? How to word it? While these questions are familiar to everyone, students with disabilities often confront unique challenges when they write.

Many students with learning disabilities are often referred to as "reluctant writers." These students may have trouble generating ideas because of gaps in their background knowledge, or, they may have vivid ideas and solid information, but have trouble finding the language to express them. In either situation, it becomes a challenge for these students to stay focused on the topic and task.

Increasingly, teachers throughout the country are experimenting with instructional practices that incorporate a variety of media to stimulate and support writing. The media may be as simple as photographs, objects, videos and tape recordings – or as sophisticated as computer software which can link text, visual imagery, sound effects, and music in a hyper-media presentation. These practices, which capitalize on students' unique abilities and interests, can be particularly powerful for students with disabilities, many of whom experience repeated failure with "mono-media" – pencil and paper.

Students with learning disabilities can benefit from using different kinds of tools that stimulate and support the writing process. Pictured is a group of students writing a multimedia story using Hypercard™ software.

Multimedia can support writing in a number of ways. It can help students deepen conceptual understandings. It can engage their prior knowledge and help them form mental images. It can also provide tools for composing and publishing. Perhaps most importantly, it can ease the transition from concepts and images to words.

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Good Teaching + Multimedia = Writing Success

Martha Gowetski's tenth-grade English class in Wayland, Massachusetts – which includes students with learning disabilities – is buzzing with activity.

One group of students is crowded around a large flow chart mapping out their adventure story. They are busy editing text cards, taping pictures, and placing compact disks on the chart. Several students are drawing pictures, and others are scanning photographs into the computer. Two girls are working together to create interactive "buttons" which link rock songs to their story. Someone calls out "Twenty seconds of silence please so I can tape!" and the room is quiet.

What is going on here? Students are composing interactive adventure stories, using HyperCard™ software, for others to read on the computer.

Martha has been doing this project with her English classes for the past three years. She starts the three-week unit by showing her students stories composed by previous classes. After her students read these stories, they are eager to get started.

Students begin their projects by forming groups and brainstorming story topics and plots. These often reflect their interests and concerns – music, dating, parties, and bizarre (and sometimes gory) events. Once they have formulated a basic "plot plan," groups begin writing. Each story includes points at which the reader is asked to make a choice between two actions like "go to Valencia's" or "go to drug store." Each choice leads the reader down a separate story path.

Every group determines how their work will get done. Some decide to write the entire story together, while others opt to break into smaller groups that will each work on a different branch of the narrative.

After they have done considerable work on their stories, Martha gives each group a hypermedia template that will help them create their interactive tales on the computer. (Martha says she does not introduce the technology at the start of the exercise because she does not want it to become its driving force.)

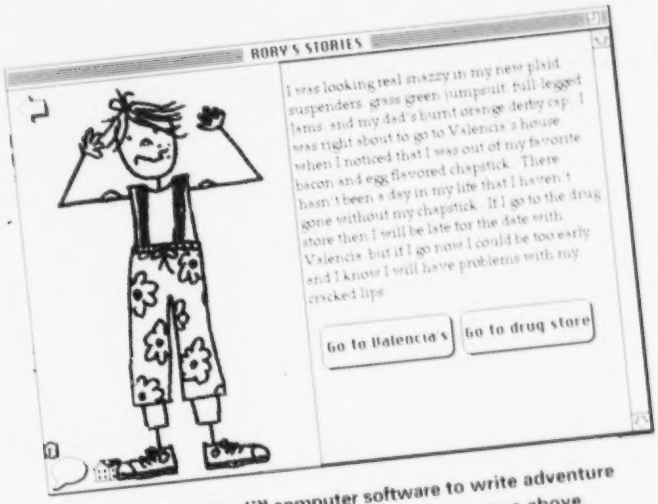
Using the software, students begin to compose their stories on the computer. They link their text to sound and graphics by creating on-screen "buttons" that readers will activate as they move through the narrative. Again, each group decides how they will divide the tasks, allowing members to choose activities that both engage their interests and build on their strengths.

For example, one group relied on an artistic member to draw all of their pictures. Two students sat at her side, offering suggestions about what to draw, while another student scanned in the completed drawings.

Evaluation is an integral and on-going component of the project. Three times during the three-week unit, students complete evaluation forms that give them the opportunity to reflect on their own work, the work of other members in the group, and the entire project. These on-going evaluations enable Martha to detect emerging problems and help groups make adjustments where necessary.

"The kids are remarkably on target in evaluating themselves, their peers, and the project," Martha said.

To see the Wayland program in action, watch *Multimedia and More* on the enclosed NCIP videotape.


RORY'S STORIES
I was looking real snazzy in my new plaid suspenders, grass green jumpsuit, full-legged jams, and my dad's burnt orange derby cap. I was right about to go to Valencia's house when I noticed that I was out of my favorite bacon and egg flavored chapstick. There hasn't been a day in my life that I haven't gone without my chapstick. If I go to the drug store then I will be late for the date with Valencia, but if I go now I could be too early and I know I will have problems with my cracked lips.
Go to Valencia's
Go to drug store

When using HyperCard™ computer software to write adventure stories, students create various "cards" like the one above.

How Students with Learning Disabilities Benefit

While this type of project can benefit any student, it supports students with learning disabilities in several important ways. First, by writing stories for their peers to read, students have a highly motivating purpose for writing.

Secondly, students draw from their own interests and background knowledge to develop the themes and plots. Third, by using multimedia, they can engage in non-print activities that capitalize on their strengths.

Finally, students are supported by the teacher and the peer group. Martha explained that one of her students who tends to be disorganized, experienced unprecedented success while working on the project. Because the group helped her to stay focused, her creativity and storytelling abilities surfaced.

"So this project played into her strengths. Someone else could remind her of the next steps, deadlines, and help her organize herself and her work. All the group members gave her very high marks, including herself, and she was really a core member of that group," Martha said.

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Teens Explore Inner-City Life through Video Production

When the lights went on after the screening of her group's documentary "360° of Violence," 18-year-old Ebony Williams breathed a sigh of relief.

"All of our hard work paid off. Our audience was very responsive to our tape. Their responses gave me the feeling that I had accomplished something that was very good," she said.

Ebony Williams is one of the urban teens participating in an innovative video production program at the Educational Video Center (EVC) in New York City.

The program, a collaborative project with the Center for Children and Technology, was designed to document how video production can promote rigorous, collaborative student inquiry and expression.

EVC's video production process is built on a "youth empowerment approach" that teaches students to draw on knowledge and issues that are relevant to their lives. In the program, groups of students work together to explore, research, analyze, and reflect on issues that confront them everyday – issues like poverty, racism, and drug abuse.

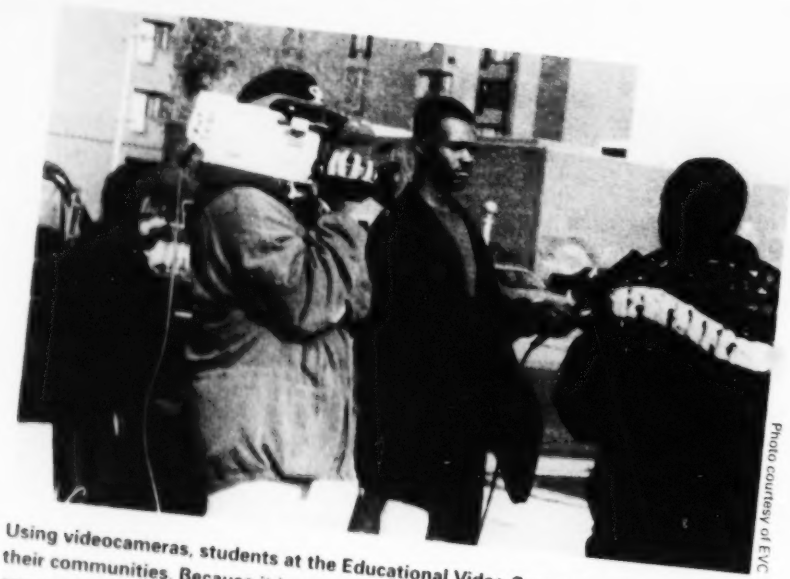

Photo courtesy of EVC

Using videocameras, students at the Educational Video Center document life in their communities. Because it incorporates a variety of tasks, video production can present a range of learning opportunities.

When students produce videos at EVC, they perform many of the same tasks involved with writing. They immerse themselves in research, choose a topic, write multiple drafts, share their writing with peers, and revise. Other steps involved with video production include using a camera, shooting and logging footage, and screening and editing videotape.

Video production is a powerful medium for students at EVC, many of whom are at risk for learning disabilities. It allows them to explore many different areas of study, work with their peers to divide responsibility for a wide range of tasks, bring real images and content to their ideas, and create a meaningful work for a real audience.

"Besides learning the technical parts, I also learned how to work with people. I learned how to clearly express my ideas and how to compromise. Through working on our documentary on the problem of abandoned buildings in New York, I've learned how documentaries can make people aware," said Peggy Buckler, a 17-year-old participant in the EVC project.

Photo courtesy of EVC

Students participating in the EVC program "have turned their cameras on themselves and created a collection of self portraits that uncover truths about loyalty, drugs, fashion, cops, and dating," said Steven S. Goodman, the executive director of EVC.

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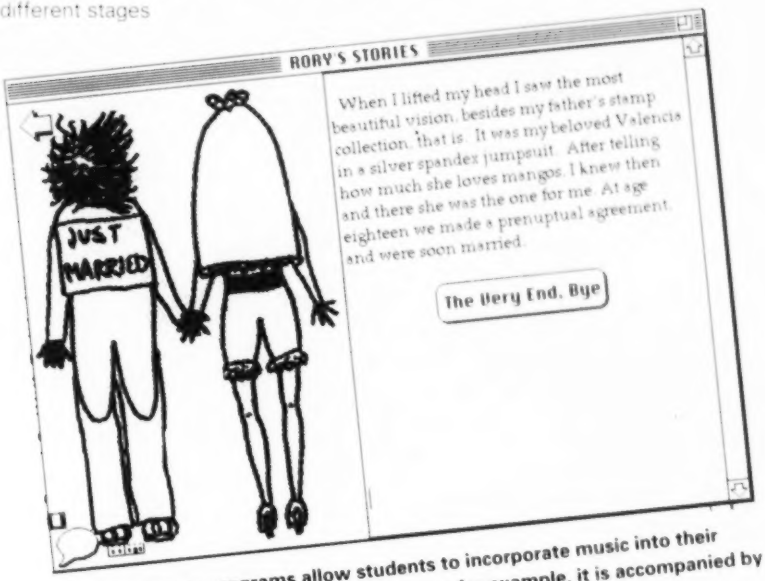
Strategies for a Successful Multimedia Project

- Base writing on tasks that have a purpose
- Incorporate a process approach with explicit steps
- Allow students to build on their interests and background knowledge
- Promote connections between home and school cultures
- Encourage students to use all of their senses and reflect on ways they learn best
- Integrate a variety of tools that tap different strengths, skills, and abilities
- Have students work collaboratively with peers toward a common goal
- Provide ongoing support and evaluate progress throughout
- Have students evaluate themselves at different stages


RORY'S STORIES
When I lifted my head I saw the most beautiful vision, besides my father's stamp collection, that is. It was my beloved Valencia in a silver spandex jumpsuit. After telling how much she loves mangos, I knew then and there she was the one for me. At age eighteen we made a prenuptual agreement and were soon married.
The Very End. Bye
JUST MARRIED

Some computer programs allow students to incorporate music into their work. When this picture appears on screen, for example, it is accompanied by a song with the lyrics, "Just one look – that's all it took."

Additional Resources

More about Multimedia on NCIPnet

- Instructional tips and ideas from classrooms around the country
- Supporting materials and work samples from the Wayland and EVC projects
- Synopses of research on using various media approaches to teaching
- Descriptions of multimedia hardware and software tools
- On-line discussion events featuring experts in multimedia
- On-line support and assistance from other teachers, parents, and administrators implementing multimedia approaches

Readings

Daiute, C. (1992). Multimedia composing: Extending the resources of kindergarten to writers across the grades. Language Arts, 69, 250–260.

Boone, R. & Higgins, K. (1992). Multimedia: TAM topical guide #1. Reston, VA: Council for Exceptional Children, Technology and Media Division.

Skolnik, R., Larson, A., & Smith, C. (1993). The power of multimedia. Electronic School, A6–A9.

Tally, B. (1993). Inquiry Learning Though Video Production. News from the Center for Children and Technology and the Center for Technology in Education, 2(5), 1–6.

Be an active member of the NCIPnet Community!

Log on to NCIPnet and:

- **Share your experiences – successes and problems – using multimedia in the classroom**
- **Post samples of your students' work on the network**
- **Discuss with colleagues the pros and cons of various multimedia tools**

NCIP

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NCIP Profiles 3
Fall 1994

What's Inside

- Why sensory feedback is critical to the writing process
- How technology meets the individual and changing needs of students who are visually impaired
- Ways schools and families can support the process
- Meet two students who are visually impaired using technology in mainstream classes
  - Rebeka Schiess, a third grader with cerebral palsy
  - Angie Bourdeau, a high school sophomore
- A glossary of assistive technology features for students who are visually impaired
- A list of additional resources about assistive technology for students who are visually impaired on NCIPnet

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"Write" Tools for Students Who Are Visually Impaired

Angie Bourdeau (left), a high-school sophomore who is visually impaired, uses her portable Braille 'n Speak™ to take notes while working on a project with her classmates.

Feedback and the Writing Process

Sighted writers depend heavily on visual feedback during different phases of writing. When they write on paper or enter text into the computer, they look at what they have written to be sure that the words make sense and are spelled correctly. When they compose or revise, they frequently look back at previously written sections and insert, delete, or revise text; reorganize paragraphs; or make marginal notes. They also depend upon printing their work in the same writing system used by most of their readers.

Lacking visual feedback, writers who are visually impaired frequently use alternative means of displaying text which rely on other senses. The glossary on page 4 highlights some of the ways assistive technology uses braille, speech, and magnification to assist writers who are visually impaired.

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Technologies Address Individual Needs

Meet Rebeka

Rebeka Schiess is an energetic nine-year-old who loves cats and horseback riding. Rebeka was born with cerebral palsy and uses a wheelchair. She is fully integrated into a third-grade classroom outside of Rochester, New York.

Rebeka has limited vision and is an avid reader using braille. She has trouble using a braille keyboard to write, however, because of the motor difficulties associated with her cerebral palsy (braille keyboards have nine keys and require the user to press two or more keys down at a time). As an alternative, Rebeka uses an Apple IIGS™ computer with braille letter overlays on the standard keyboard. An Echo™ speech synthesizer names each letter as she types. In order to monitor structure and meaning while revising her work, Rebeka can use the synthesizer to listen to her sentences and paragraphs.

Rebeka's computer has braille conversion software that allows her to print out her work on a braille embosser at school.

"It is critical that Rebeka (pictured) and other writers using braille have a tactile document that can be shared, held, cherished, and hung on the refrigerator door," said the father of Rebeka Schiess, a nine-year-old who is visually impaired.

Meet Angie

Angie Bourdeau is an enthusiastic fifteen-year-old sophomore from Chicopee, Massachusetts. She loves music and divides her spare time between singing in a chorus, playing piano, and practicing Kung Fu. Angie has been blind since birth and has always participated fully in mainstream public schooling.

Introduced to braille at the age of four, Angie is a very proficient braille reader and writer. In the eighth grade she began using a Braille 'n Speak™, a portable device about the size of a large wallet that combines braille input and speech output.

Using the Braille 'n Speak (which she can carry in her pocketbook), Angie can write class notes, homework assignments, and short papers in braille. The device also provides speech feedback so that Angie can monitor what she writes. After she has completed work, she can either load her files onto a desktop computer or connect the Braille 'n Speak directly to a printer. The device has braille conversion software that enables Angie to print out her work on either a braille embosser or conventional printer.

Angie finds the Braille 'n Speak more convenient to use than a standard personal computer because it capitalizes on her facility with braille and has the flexibility of pen and paper.

Wherever she goes, Angie Bourdeau carries her Braille 'n Speak, a portable device that can "speak" directional information from its files.

Reflecting on his sometimes arduous path to educational success, Adam Linn, a junior at Harvard University who is blind, said, "Human support is infinitely more important than technological support."

School and Family Participation Is Key

Rebeka and Angie are successful writers because their vision specialists, school administrators, teachers, and parents have all worked together to find technology that is well suited to these students' needs.

Rebeka's vision specialist, Arlee Valentine, works closely with Rebeka's teachers to adapt computer technology and other materials for Rebeka's use. Throughout the year, she consults frequently with Rebeka's parents, who are always investigating new technology and other materials and sharing this information.

The third-grade teachers meet to plan instructional activities for all their students and to brainstorm ways to make these accessible to Rebeka. Administrators support teachers in this effort by providing release time for weekly meetings.

Angie's mother, Diane Bourdeau, stresses the importance of open and honest communication among all those involved in the education of a student who is visually impaired. To achieve this goal, each spring she and Angie's vision specialist, Kathy McNamara, meet with all of the teachers who will have Angie in their classes the following year. At the meeting, the challenges and rewards of having Angie in a class are discussed and teachers are encouraged to share their fears and concerns. Some teachers embrace the opportunity to have Angie in their class, while others are more apprehensive. Diane Boudreau reports, however, that once teachers have Angie as their student, their fears dissipate and they take great pleasure in her unique strengths and sheer love of learning.

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Technologies Meet Changing Curricular Needs

As students who are visually impaired progress through school, they must have independent access to flexible technology that can address their changing needs.

Rebeka Revisited

Because Rebeka has been learning the fundamentals of writing in first and second grade, she has done most of her writing in the classroom. Using her desktop computer, speech synthesizer, and braille embosser, she has been able to participate in all classroom writing activities including daily journal writing, story and poem drafting, peer and teacher conferencing, and revising.

When Rebeka progresses to fourth grade, the curriculum will include more writing activities that she must work on at home as well as in school. She will, for example, be expected to write book reports and longer compositions. During the following year in fifth grade, Rebeka will change classes throughout the day for the first time.

Because of these evolving demands, Rebeka's parents and teachers agree that Rebeka needs a more efficient and portable writing system. After extensive research, they ordered a Keynote Gold™ system – an integrated system that includes a portable computer with a standard keyboard, built-in speech feedback, and braille conversion software that allows users to print their work in text and braille formats. Rebeka's parents are also seeking funds for a braille embosser Rebeka can use at home.

Rebeka's vision specialist, Arlee Valentine, will help Rebeka adjust to the new system. So that Rebeka might eventually feel comfortable using computers in any setting, Arlee would like to reduce Rebeka's dependency on braille stickers for keyboarding.

Rebeka Schiess – a third grader with limited vision and cerebral palsy – can participate fully in all classroom writing activities using a desktop computer, a speech synthesizer, and a braille embosser.

Angie Revisited

Moving from one class to the next throughout each school day, Angie needs the portability, flexibility, and speed provided by a Braille 'n Speak.

In addition to using this tool in the classroom, Angie occasionally uses the Braille 'n Speak to navigate in the community. For example, when Angie forgets the location of a certain store in the mall, she calls up a file on her Braille 'n Speak that lists mall locations. Once the file is accessed, the device speaks this information to her, and off she goes.

Angie is looking ahead to college, where she hopes to major in music. Because she will be required to write papers of increasing length in the next few years, a portable external disk drive with more storage capacity has been ordered for her Braille 'n Speak.

To increase Angie's access to a broad range of materials, including encyclopedias, dictionaries, and databases, Angie's parents have acquired a CD-ROM drive and speech card for Angie to use at home.

To learn more, watch *The "Write" Tools for Angie* on the enclosed NCIP videotape.

A Braille 'n Speak can be connected directly to a conventional printer or braille embosser. Files created on a Braille 'n Speak can also be easily transfered to a desktop computer.

Technologies That Provide Sensory Feedback

Braille/Tactile

Braille Keyboard: A nine-key device that enables users to "braille in" text. A braille keyboard may serve as an alternate keyboard for a standard computer or may be an integral part of a computer-based assistive device.

Braille Keyboard Conversion Software: Software that converts a standard keyboard into a braille keyboard. Nine specified keys on the standard keyboard are used to "braille in" text.

Braille Keyboard Labels/Overlays: Labels with braille letters that can be placed on individual keys. Alternatively, braille dots can be placed directly on keys with a liquid substance that hardens after application.

Tactile Locators: Tactile stickers or other materials can be strategically placed on the keyboard to identify important keys and facilitate positioning for touch typing.

"Refreshable" or "Paperless" Braille Displays: A hardware template that can display braille as it is being written. As each letter is typed, pins corresponding to braille dots pop up on the template to form braille letters. The braille display is refreshable because it can be altered as the text is changed and advanced letter by letter or line by line (depending on the size of the display). Refreshable braille displays can be a separate component or part of an integrated system. Software may be required to translate standard text to braille.

Braille Embossers: Sometimes called braille printers, these devices emboss documents in braille. Braille embossers typically have blunt pins that punch dots into special 100-pound weight paper.

Speech

Speech Output Software: Software that translates standard text into a phonetic code that can be "spoken" by a speech synthesizer. Speech output can be integrated into a specific application, such as a word processing program.

Screenreaders: Software that works in conjunction with other applications and converts the text on screen into speech output. Some personal computers come with built-in screenreaders.

Speech Synthesizers: Hardware that produces speech output. This can be an external unit that connects to a computer, or an internal chip or circuit card.

Visual Magnification

Magnifying Lenses for Monitor: Sometimes called optical aids, these portable lenses can magnify text up to twice its original size. They are designed to fit over many standard computer monitors.

Magnification Software: Software that allows users to enlarge text on the computer screen, sometimes up to sixteen times its original size. These programs run in conjunction with other applications and usually have features that facilitate cursor navigation.

Magnification Hardware: A special magnification card that replaces the existing video card in the computer.

Additional Resources

More about Assistive Technology on NCIPnet

- Descriptions of a wide variety of technology that can help students who are visually impaired
- Names and addresses of vendors who distribute technologies
- Organizations that provide technical assistance
- Vignettes of students using various technologies
- On-line support and assistance from teachers, parents, and administrators
- On-line discussion events featuring experts on assistive technology for students who are visually impaired

Be an active member of the NCIPnet Community!

Log on to NCIPnet and:

- **Share information about products and teaching approaches**
- **Discuss technology adaptations that address individual needs**
- **Share your experiences – successes and problems – implementing assistive technology for students who are visually impaired**

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NCIP Profiles 4
Fall 1994

What's Inside

- How laptops benefit students with disabilities
- What to consider when implementing a plan for laptop use
- Examples of how schools are using laptops
- Features of portable computers and writing tools
- A list of additional resources about laptops on NCIPnet

Lightweight and portable, laptops can be carried from class to class as easily as bookbags.

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Learning with Laptops

Because laptops can help students with learning disabilities write in different settings, some schools are implementing programs in which students are given access to these portable computers.

Schools Address Implementation Issues

In an ideal world, students who need computers to write effectively would have them in their classrooms, at the public library, and on the kitchen table at home. In reality, schools must find ways to make a limited number of computers widely available for as many students as possible.

Portable laptop computers can provide students with disabilities access to writing in many settings. Once a school decides to establish a program in which students are given access to laptops, however, teachers and administrators must grapple with a variety of implementation issues. Three key questions that must be answered are: What criteria should be used to decide which students have access to laptops and for what purposes? What systems will be used for scheduling and managing the use of laptops so that they can be used in a variety of settings? And finally, How will the laptops be kept secure and in good working order?

The solutions will vary and depend upon a school's available resources, its organizational structure and curriculum, and the needs of its students. The story that follows on pages 2 and 3 provides an example of how one high school addressed these issues. Also profiled on the next pages are other school programs that have successfully dealt with a variety of implementation issues that arise when students are given access to laptop computers.

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Laptops to the Rescue at Shrewsbury High

In the spring of 1993, Caroline Gilmore – a teacher of students with learning disabilities at Shrewsbury High School in Massachusetts – noted there were several students with significant learning disabilities on the roster of incoming eighth graders.

Caroline knew that these students had been using desktop computers in the middle-school resource room to circumvent their mechanical difficulties when writing. Thinking about the high school curriculum, she realized that these students needed access to computers in their mainstream classes.

Who Should Have Access

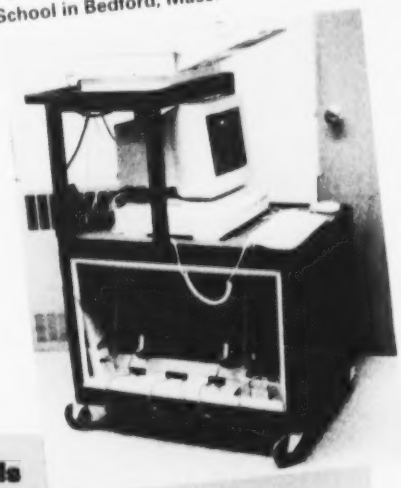
Caroline was aware that Shrewsbury High School had five laptops that were housed in the computer lab and available to both students and teachers on a sign-out basis. She knew, however, that students with learning disabilities had not used this resource in the past. To explore ways these students could gain access to the laptops, she met with Donna Simone, the school's special education coordinator, and Brian McDermott, the district technology director.

The group agreed that laptops could help students with disabilities participate more fully in mainstream classes. Brian then procured two additional laptops for the special education department.

Caroline identified two students who, because of their fine-motor impairments and attentional problems, were unable to write successfully without a computer. Because of the severity of their disabilities, it was decided that these students would be given priority access to the two SPED department laptops.

The group also decided that Caroline and other teachers of students with learning disabilities would target specific situations in which other students could benefit from using laptops.

A rolling cart designed for an interdisciplinary project at John Glenn Middle School in Bedford, Mass.



How Plans Are Implemented

While this approach has been in place for nearly a year, it continues to evolve. When teachers identify a student's need for a computer, they first check to see if one of the SPED department computers is available. If both are being used, they speak with Sue, the computer lab coordinator, and sign out one of the lab's available laptops. The teacher or student then picks up the computer for the specified periods and returns it afterwards.

Increasingly students are taking responsibility for reserving, picking up, and returning school laptops. As part of a larger effort to promote self-advocacy skills, students are encouraged to anticipate assignments or classes where laptops would be of tremendous use. After identifying these situations, students are encouraged to make the necessary arrangements to acquire laptops and return them on their own.

To minimize confusion, a desktop application called At Ease™ is loaded on each laptop that insures students save files on their own "save disk" and not the hard drive. These floppy disks are primarily housed in the resource room to help safeguard against damage or loss. Teachers or students retrieve the needed disk from

Dock 'n Roll: Laptops on Wheels

At John Glenn Middle School in Bedford, Massachusetts, sixth graders are using laptop computers for an interdisciplinary project that spans four classes: language arts, social studies, science, and math.

Before this project began, the John Glenn teachers raised the following concerns about the program: How will the computers be transported from classroom to classroom? How will teachers monitor and assess student work? How will students save and print their work?

To address their concerns, a large rolling cart was designed. The cart contained six laptop computers with six docking spaces, a desktop computer, and a laser printer.

Students involved in the project roll the cart from one classroom to another. As needed, they take laptops out of their docking spaces where batteries have been recharging. Students can print documents by connecting their laptop to the printer on the cart.

When docked, the laptops are connected to the desktop computer so teachers can easily access student files to evaluate work and type in comments. Each laptop's hard drive can also be backed up on the desktop computer, so if students accidentally erase their files, a copy can still be accessed.

Round-the-Clock Access

In St. Cloud, Minnesota, educators in District 742 believe that if a student's ability to communicate effectively is dependent upon technology, he or she should have access to that technology at all times. This strong commitment has motivated district staff to find ways to ensure that students with communication disorders have 24-hour access to assistive devices. More recently, students with severe writing problems have also been given round-the-clock access to laptop computers.

Families and community organizations in the district are often asked to play a role in the implementation process. For example, the district may buy a

According to special ed teacher Caroline Gillmore, her students with disabilities who are using laptops are thriving in their mainstream classes.

the disk box in the resource room and return it after the students' current work is saved on the disk. Individual "desktops" that give users access only to the applications they need can also be created with At Ease.

Students are able to print out their documents either in the resource room or in the computer lab. Students may also reserve laptops from the computer lab for home use. As with the in-school lending programs, this is arranged on a first-come, first-served basis.

Keeping Laptops Secure and Running

Laptops were initially designed for incidental business use, not for the wear and tear exacted by even the most careful students. Security and maintenance issues must be addressed when laptops are being crammed into backpacks, dropped off in lockers, and taken off school grounds by different students.

At Shrewsbury High, the laptops are stored in locked cabinets in the computer lab and the resource room. To minimize damage, the school has invested in padded carrying cases. If anyone notices a problem with a computer, they inform the computer lab coordinator. Twice each week, a technician from a computer company contracted by the school district comes to fix and maintain the computers.

Before a laptop can be taken home by a student, a parent or guardian must sign and submit a form stating that his or her homeowner's or renter's insurance policy will cover any loss or damage to the computer when it's in the student's possession off school grounds.

Evidence of Success

Caroline reports that many of her students with disabilities who are using laptops are thriving in mainstream classes. For example, one of her students can begin his extensive vocabulary assignments on a laptop in English class and finish them later in the resource room aided by coaching from Caroline. Rather than falling behind his peers, this student has been given a tool that helps him keep up the pace and succeed.

Recently, two students with learning disabilities arranged to have laptops over a period of several days so that they could participate in a school-wide writing contest. They worked on their stories in their language arts classes, in the resource room, and at home. When their work was complete, both were proud of their entries.

Demand for laptops is certain to grow as more and more Shrewsbury teachers become aware of the ways in which these portable computers can help students who have difficulty writing. Looking ahead, educators at Shrewsbury are currently extending a school-wide network that will allow students access to their files from any computer in the school.

laptop in conjunction with a community service organization, parents may purchase the maintenance contract, and the school may carry the insurance.

The individual student's educational plan (IEP) is the centerpiece of this approach. The technology is written into the IEP as a tool for meeting specific educational goals (access to the technology is not the goal in and of itself). Teachers, parents, and administrators agree upon the implementation details and these are explicitly documented in the IEP.

Project PULSE: One Student, One Laptop

As part of Project PULSE (Pupils Using Laptops for Science and English, sponsored by the Center for Technology in Education), a group of students at the Abraham Clark Junior/Senior High School in Roselle, New Jersey, were given laptops to use for the entire school year.

Before receiving their computer, students signed an agreement outlining their responsibilities for the laptop's safety. Teachers also provided students with a schedule detailing what should be done with the computer during each part of the day, as well as a list of places that were off-limits to laptops (including the cafeteria and the gym). A lockable closet was provided for times when students needed a safe place to leave the computer. As students became more adept at negotiating school with a laptop in tow, policies became more flexible.

Students were urged to keep their laptop batteries charged. For times when batteries unexpectedly ran down, power strips were installed in classrooms where computers were used most. When computers malfunctioned, extras were available as short-term backups.

For more information see "Year One of Project PULSE: Pupils Using Laptops in Science and English," written in 1993 by K. McMillan and M. Honey in volume 26 of *Technical Report*, a publication of the Center for Technology in Education in New York.

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Electronic Writing Tools and Portable Computers

Electronic Writing Tools

The following portable writing tools offer fewer features and memory than the laptops described at right, but are available at a significantly lower cost.

Diskless Portables
(approx. $240/discounted when purchased in quantity)
The Laser PC4™, for example, is a two-pound, battery-operated laptop computer with a standard keyboard and built-in programs for word processing, spreadsheets, and databasing (the screen, however, displays only four lines). Files can be transferred to and from Macintosh®, Apple®, and DOS computers, as wells as e-mail networks.

Simple Note-Takers
"Smart Keyboards" (approx. $270/discounted when purchased in quantity)
These portable keyboards can be used for taking notes and can store up to 15 pages of text. The AlphaSmart™, for example, is a Macintosh-compatible, battery-powered portable keyboard with a built-in four-line screen display. Text can be entered and edited and then easily transferred to a Macintosh computer for formatting and printing.

Dedicated Word Processors
($500–$600)
These electric typewriter-like devices are equipped with a 7- or 14-line screen display and temporary storage memory which allows the user to store, retrieve, and edit a document before printing it out from the word processor. Many have built-in spellcheckers, dictionaries, and thesauruses. Some word processors, like the Portable Daisy Wheel Word Processor™ by Brother®, also provide a DOS compatible disk drive so that files can be saved and transferred to a computer.

Portable Computers

There is a broad continuum of portable computers currently available. More detailed information that can help guide buyers with purchasing decisions is available on NCIPnet.

Laptops or Notebooks
($1,400–$7,000)
The terms laptop computers and notebook computers are used interchangeably to describe small full-featured computers that weigh under eight pounds, like the Toshiba 3950™ and the portables in the Apple PowerBook™ series.

Sub-Notebooks
($2,500–$4,000)
These computers, like those in Apple's PowerBook Duo™ series, are smaller and lighter than traditional laptops. While only weighing between four and seven pounds, they can also be expanded into complete desktop systems.

Portable Computers Adapted for Wheelchair Use
($6,000 and up)
These portables, with many or all the features of desktop computers, are specially designed to be mounted on a power wheelchair. The Synergy PC™ computer system, for example, houses the body of the computer in a case that is attached to the back of a wheelchair and can be hooked into the wheelchair battery. The LCD display is separate from the computer and can be mounted in front of the user. Speech synthesizers, switches, environmental controls, and other adaptive devices can also be added to these systems.

Additional Resources

More about Using Laptops on NCIPnet

- In-depth information on various types and features of portable computers
- Information to help you determine which type of portable computer best meets your needs
- Descriptions of other students, classes, and schools using laptops
- Vignettes of students with disabilities using laptops
- Additional tips on managing laptop use in schools and at home
- On-line support and assistance from teachers, specialists, and administrators
- On-line discussion events featuring teachers and researchers exploring innovative uses of laptops

Be an active member of the NCIPnet Community!

Log on to NCIPnet and:

- **Ask colleagues questions about using laptops**
- **Ask colleagues questions about the features and capabilities of different laptops**
- **Share your experiences – success and problems – managing laptop use**
- **Describe your reactions to different products**

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NCIP Profiles 5
Fall 1994

What's Inside

- Ways technology can help preschool teachers include students with disabilities in developmentally appropriate activities
- A profile of Sabrina, a 5-year-old girl with cerebral palsy who uses technology to make choices and interact with her peers
- Descriptions of the technologies Sabrina uses
- How a specially designed keyboard aids students with autism
- A list of additional resources available on NCIPnet

Technology Supports Inclusion in Preschool

Providing All Preschoolers With Opportunities to Learn

Increasingly, students with disabilities are being educated in preschool settings together with typically-developing children. As the youngest students with disabilities strive toward the same developmental milestones as their non-disabled peers, the challenge is to provide all students with opportunities to:

- develop autonomy by expressing their own preferences and interests
- learn the social nuances of engaging in group learning experiences
- deepen their language skills and become effective communicators

Teachers and specialists throughout the country are exploring ways technology can help preschoolers with disabilities reach these goals. Take, for example, Barbara Smith at the Diagnostic Center in Brockton, Massachusetts. With the help of Helen Virga, Brockton's computer specialist, Barbara has discovered a range of technologies that enable her students with disabilities to participate in all aspects of her typical preschool curriculum. Barbara's classroom moved from a self-contained model to an integrated model two years ago. About the change she says, "Integration is easily twice the work in terms of preparation, but when we consider the progress these kids have made, we could never go back."

Fellow classmates help fasten pictures to Sabrina's eye-gaze board.

Photo: Jeff Dunn

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All Students Make Choices, Interact with Peers

Integrating students with disabilities into a classroom with non-disabled children presents many challenges. How will children who cannot speak make themselves heard? How will students who have limited movement participate in activities with their peers? And how can students achieve some degree of independence so that they can interact without adult help?

These are just some of the issues that Barbara Smith has tackled in her classroom of 14 children, 8 of them typically developing and 6 with severe speech and physical impairment (SSPI).

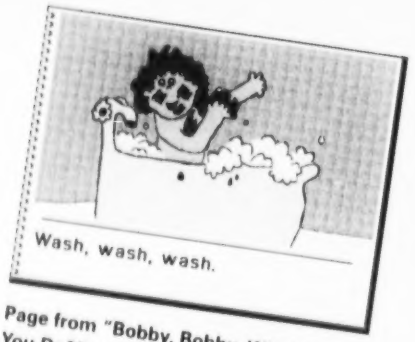
All of Barbara's students with disabilities share a strong need for augmentative communication strategies to help them interact. Barbara has always relied on relatively simple approaches such as communication boards and picture charts, and has only in the past two years turned to more sophisticated computer-based tools to supplement these approaches.

Free Choice Time

Sabrina, an engaging 5-year-old girl with cerebral palsy, cannot speak or point. To help her communicate her preferences, she sometimes uses an eye-gaze board, a simple apparatus consisting of a Plexiglas frame with Velcro tabs. During free choice time, Jan, a classroom aid, places the eye-gaze board perpendicular to Sabrina's wheelchair tray and fastens six pictures of her preferred activities – such as read a book or listen to music – around its edges. Jan stands behind the board to gauge where Sabrina's eyes are pointing. By looking directly at one of the pictures, Sabrina chooses "Bobby, Bobby, What Can You Do?" her favorite book on computer.

Often, young children with SSPI are given one choice at a time and asked to indicate "yes" or "no," while typically-developing children pick from a field of choices. By featuring a range of options, the eye-gaze board allows Sabrina to make authentic choices alongside her non-disabled peers. Once the choice is made, Jan connects a switch on the left side of Sabrina's wheelchair tray to a simple "switch box," which plugs directly into the computer. The software for "Bobby, Bobby" is loaded and Sabrina is on her own.

Using its internal speech capability, the computer reads the story aloud while highlighting the words. By hitting a switch when she is ready, Sabrina turns the pages at appropriate



Page from "Bobby, Bobby, What Can You Do?" which a computer "reads" by its internal speech capability.

times. Sabrina clearly delights in the story, laughing to herself when the main character, Bobby, gets dirty playing in the mud.

When she is done, Sabrina hits another switch on the right side of her tray that activates an electronic speech aid called SpeakEasy™. The message "Come here please" is clearly emitted. This 12- by 8-inch device has 12 squares or "message locations" that hold discrete prerecorded messages. Jan has recorded the various messages that Sabrina will need for the day and Sabrina's switch can be plugged into any of these locations, depending on the activity she is engaged in.

Jan responds to Sabrina's call for assistance and enlists the eye-gaze board once again. Like most kids, Sabrina likes to read her favorite stories more than once and chooses "Bobby, Bobby" again. Jan reloads the software and Sabrina is off and "reading" again.

Circle Time

In addition to helping Sabrina and the others develop their autonomy by making choices, Barbara ensures that all students participate during circle time. Many preschool classrooms offer daily group activities that promote listening to peers, turn-taking, and collaborative problem-solving. Circle time in Barbara's classroom incorporates many activities that focus on these social-cognitive goals.

Barbara begins by asking students to take turns describing the day's weather. Non-disabled students walk up to the front, pick from a variety

Photo: Jeff Dunn

Barbara Smith holds the Communiclock™ for Sabrina, who uses the device to participate in circle time alongside her peers.

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of weather pictures (such as sunny, cloudy, rainy) and place them on the calendar.

Sabrina's turn is next. She uses a clock-like rotary scanning device with weather pictures mounted on the face to make her choice. Jan activates the clock and Sabrina closely watches the hands move around the dial, hitting her switch (which is now plugged into the device) to "stop the clock" at the picture she feels is most accurate. Jan confirms the choice with Sabrina and places it on the calendar. Sabrina's peers enjoy watching this process and "sing out" the names of the pictures as the clock hand sweeps over them. Occasionally, typically-developing students ask to take their turn on the clock.

Next, students sing a song together. Today's song is "The Fish in the Sea Go Splash, Splash, Splash." Again, non-disabled students indicate the "fish" they want to sing about (such as crab, shark, porpoise) by choosing pictures and placing them on a chart. Sabrina uses her eye-gaze board to choose a crab and the whole class sings the song together incorporating the crab.

Sabrina also participates in the singing. She uses the same speech aid that she previously used to get Jan's attention, only now it is plugged into a message location with the song's prerecorded refrain, "splash, splash, splash." As the group sings "The crab in the sea goes..." Sabrina positions herself to hit her switch and delights in bellowing "splash, splash, splash" with her peers.

The eye-gaze board also allows Sabrina to interact independently with her peers. After the students break for snack, they have free choice time. Without adult prompting, two students ask Sabrina if she wants to sing the song again. She excitedly indicates "yes" and they wheel her over to the song chart. They use the eye-gaze board to provide her with choices and then together sing the song incorporating the "fish" she has chosen.

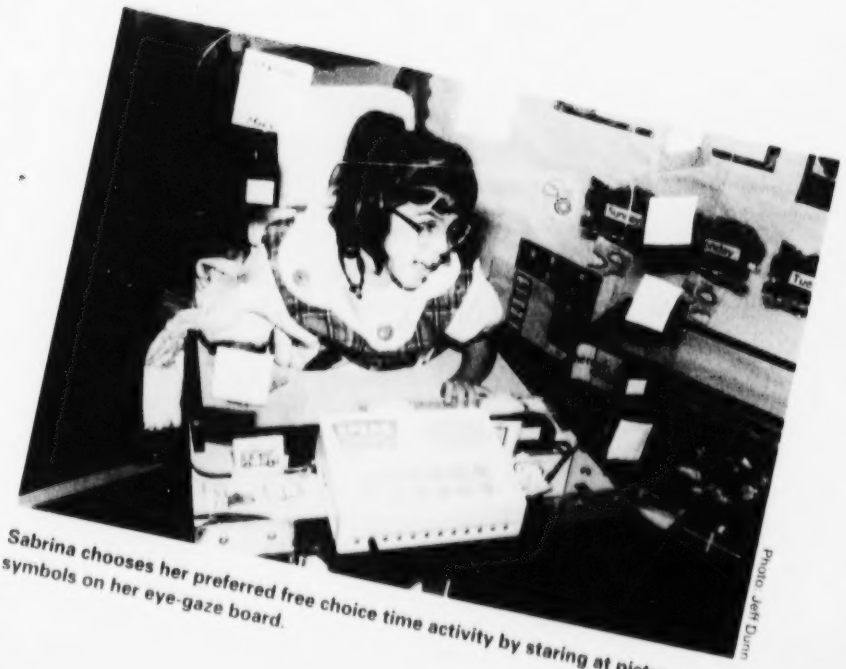

Photo: Jeff Dunn

Sabrina chooses her preferred free choice time activity by staring at picture symbols on her eye-gaze board.

Expanded Keyboard Helps Students with Autism Write

Paula Brassil, left, demonstrates a membrane keyboard to a student.

At the Warren Prescott School in Boston, Paula Brassil has developed an integrated program for her five students with autism (ages 5 through 7). These students spend half of each school day with a small group of typically-developing kindergarteners. While all of Paula's students benefit from developmental writing, she feels that these skills are especially critical for her students with autism. For them, writing is another means of expanding their limited communication repertoire.

Keeping her students with autism focused is always a challenge, particularly during group activities. Paula often uses the computers as an attentional anchor but finds that her students are often overwhelmed by the standard keyboard. The mix of letter and abstract function keys, as well as the random placement and small size of letters, can be confusing.

Paula has been able to minimize her students' frustration by introducing them to IntelliKeys™, a 15 inch by 10 inch membrane keyboard with enlarged boldface letters displayed in alphabetical order. Students can readily see the letters, learn their locations, and confirm their selections by listening to the speech feedback as they write. Since using IntelliKeys, her students are more attuned to letters and their corresponding sounds and this foundation is having a positive impact on their emerging literacy skills.

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Technologies for Preschool Classrooms

A Sampling of Supports for Preschoolers

Descriptions of the kinds of hardware and software discussed in this profile are included below. These represent a small sampling of technologies available to meet the individual needs of students with disabilities in preschool settings. NCIP is not endorsing any product or manufacturer and strongly encourages readers to explore a range of products with qualified personnel in their area. A more comprehensive product listing, complete with addresses and phone numbers, is available in the NCIP Profiles Library on NCIPnet.

Eye-gaze Communication Boards

Eye-gaze communication boards are sometimes used when pointing is not feasible. Basically, these are clear plastic boards (about 15 inches by 19 inches) on which symbols – such as words, pictures, and objects – can be fastened. The student conveys messages by gazing at the appropriate symbols while someone on the other side of the board follows his gaze. Eye-gaze boards can be easily homemade; however, a variety of commercial products already exist, including the Eye-Com Board™ by Imaginart Communications Products and the Eye Transfer Communication System™ by Zygo Industries.

Switch-accessible Books

A software selection of switch-accessible books is available to build literacy skills and meet the physical and cognitive needs of students with motor impairments. These typically enable students to independently choose their story, turn pages, highlight, and have text "read" or reread by hitting a switch at a particular time. Many include animated graphics that can be manipulated. These include Storytime Tales™ by Don Johnston and Wiggleworks™, a more comprehensive literacy program by Scholastic.

Electronic Speech Aids

Simple and relatively inexpensive communication devices allow the user to "speak" short phrases or messages that are prerecorded for them. The devices have a set number of "targets" which can be pressed to "speak" the phrases. The targets can be labeled with symbols or words. Messages also can be accessed through one or more switches. Examples of simple "speech boxes" include Cheap Talk 4™ by Toys for Special Children and SpeakEasy™ by AbleNet.

Clock-like Rotary Scanning Devices

There are a variety of clock-like rotary scanning devices which enable students with limited motor ability to choose from a field of pictures or words. The student controls the circular movement of a pointer by activating a switch, stopping the pointer at the desired message. The speed and direction of scanning is customizable. These devices are lightweight, portable, and battery operated. Two examples include the Communiclock™ by the Crestwood Company and the Dial Scan™ by Don Johnston.

Alternate Membrane Keyboards

There are a variety of alternate keyboards that simplify access to software for preschoolers and/or students with disabilities. Membrane keyboards typically come with a variety of vinyl sheets or "overlays" with letters, numbers and special "keys" in large print. Users can also design their own overlays for individual students or specific tasks. The touch sensitivity required to activate the "keys" can be adjusted to meet the users' needs. Speech can be added to make these keyboards "talk."

Additional Resources

More about Using Technology in Preschool Settings on NCIPnet

- Student and classroom vignettes that depict innovative uses of technology in preschool settings
- Descriptions of a range of technology tools to support children with disabilities in preschool settings
- An annotated listing of projects and organizations that provide information and technical assistance
- An updated list of selected hardware and software products and a list of vendors who carry these products
- Summaries of important research findings about young students with disabilities and technology
- On-line discussion events featuring experts in the development or implementation of technology in preschool classrooms

Be an active member of the NCIPnet Community!

Log on to NCIPnet and:

- **Discuss your experiences with integrated preschool settings**
- **Share tips on ways to use technology to include children with disabilities in classroom activities**
- **Let others know what technology tools work best for you**

NCIP

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